



ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY CLASS I PERMIT

COMPANY: *Caithness Big Sandy Energy, LLC*
FACILITY: *Caithness Big Sandy, LLC*
PERMIT #: *1001532*
DATE ISSUED: *Draft*
EXPIRY DATE:

SUMMARY

This operating permit is issued to Caithness Big Sandy Energy, LLC, the Permittee, for the operation of a power generating plant, located approximately 40 miles southeast of Kingman, along U.S. Highway 93 near Wikieup, in Mohave County, Arizona.

The Caithness Big Sandy Energy Project is a natural gas-fired, combined cycle merchant power plant with a total rating of 720 Megawatt (MW) (nominal) with on-site supporting infrastructure. The facility is to be constructed in stages, with the first Stage being a 2 on 1 configuration with a rating of 500 MW (nominal). The first Stage will consist of two combustion turbine generators (CTG), two heat recovery steam generators (HRSG), one steam turbine generator (STG), and one mechanical draft cooling tower. The second Stage will be a 1 on 1 configuration with a rating of 220 MW (nominal), and will consist of an additional combustion turbine, HRSG, STG, and mechanical draft cooling tower.

Pollution control equipment for the CTG/HRSG units includes low-NO_x combusters and selective catalytic reduction (SCR) for the control of nitrogen oxides (NO_x), and an oxidation catalyst for the control of carbon monoxide (CO), as well as volatile organic compounds (VOC) and hazardous air pollutants (HAPs). The wet cooling towers will be equipped with high-efficiency drift eliminators. With the exception of the diesel-fired emergency generator and fire pump engine, the only fuel used at the facility will be pipeline quality natural gas; there are no provisions for a back-up fuel.

All definitions, terms, and conditions used in this permit conform to those in the Arizona Administrative Code (A.A.C.) R18-2-101 and Title 40 of the Code of Federal Regulations (CFR), except as otherwise defined in this permit. Unless noted otherwise, references cited in the permit conditions refer to the A.A.C. All material permit conditions have been identified within the permit with italics and are underlined. All terms and conditions in this permit are enforceable by the Administrator of the U.S. Environmental Protection Agency, except for those terms and conditions that have been designated as "State Requirements."

Big Sandy Energy is a major source because the potential emission rates of the following pollutants are greater than 100 tons per year: (i) particulate matter (PM)/PM less than 10 microns in diameter (PM₁₀), (ii) nitrogen oxides (NO_x), and (iii) carbon monoxide (CO). Big Sandy is also subject to the Acid Rain Program of the Clean Air Act. This permit is issued in accordance with Titles I and V of the Clean Air Act, and Title

49, Chapter 3 of the Arizona Revised Statutes (ARS).

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ATTACHMENT "A": GENERAL PROVISIONS

Air Quality Control Permit No. 1001532
for
Caithness Big Sandy

I. PERMIT EXPIRATION AND RENEWAL [ARS § 49-426.F, A.A.C. R18-2-304.C.2, and -306.A.1]

- A. This permit is valid for a period of five years from the date of issuance.
- B. The Permittee shall submit an application for renewal of this permit at least 6 months, but not more than 18 months, prior to the date of permit expiration.

II. COMPLIANCE WITH PERMIT CONDITIONS [A.A.C. R18-2-306.A.8.a and b]

- A. The Permittee shall comply with all conditions of this permit including all applicable requirements of the Arizona air quality statutes and air quality rules. Any permit noncompliance constitutes a violation of the Arizona Revised Statutes and is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, noncompliance with any federally enforceable requirement constitutes a violation of the Clean Air Act.
- B. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

III. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE [A.A.C. R18-2-306.A.8.c, -321.A.1, and -321.A.2]

- A. The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit revision, revocation and reissuance, termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.
- B. The permit shall be reopened and revised under any of the following circumstances:
 - I. Additional applicable requirements under the Clean Air Act become applicable to the Class I source. Such a reopening shall only occur if there are three or more years remaining in the permit term. The reopening shall be completed no later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless an application for renewal has been submitted pursuant to A.A.C. R18-2-322.B. Any permit revision required pursuant to this subparagraph shall comply with the provisions in A.A.C. R18-2-322 for permit renewal and shall reset the five year permit term.

2. Additional requirements, including excess emissions requirements, become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the Class I permit.
 3. The Director or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.
 4. The Director or the Administrator determines that the permit needs to be revised or revoked to assure compliance with the applicable requirements.
- C. Proceedings to reopen and reissue a permit, including appeal of any final action relating to a permit reopening, shall follow the same procedures as apply to initial permit issuance and shall, except for reopenings under Condition III.B.1 above, affect only those parts of the permit for which cause to reopen exists. Such reopenings shall be made as expeditiously as practicable. Permit reopenings for reasons other than those stated in Condition III.B.1 above shall not result in a resetting of the five year permit term.

IV. POSTING OF PERMIT

[A.A.C. R18-2-315]

- A. The Permittee shall post this permit or a certificate of permit issuance where the facility is located in such a manner as to be clearly visible and accessible. All equipment covered by this permit shall be clearly marked with one of the following:
1. Current permit number; or
 2. Serial number or other equipment ID number that is also listed in the permit to identify that piece of equipment.
- B. A copy of the complete permit shall be kept on site.

V. FEE PAYMENT

[A.A.C. R18-2-306.A.9 and -326]

The Permittee shall pay fees to the Director pursuant to ARS § 49-426(E) and A.A.C. R18-2-326.

VI. ANNUAL EMISSION INVENTORY QUESTIONNAIRE

[A.A.C. R18-2-327.A and B]

- A. The Permittee shall complete and submit to the Director an annual emissions inventory questionnaire. The questionnaire is due by March 31st or ninety days after the Director makes the inventory form available each year, whichever occurs later, and shall include emission information for the previous calendar year.

- B.** The questionnaire shall be on a form provided by the Director and shall include the information required by A.A.C. R18-2-327.

VII. COMPLIANCE CERTIFICATION

[A.A.C. R18-2-309.2.a, -309.2.c-d, and -309.5.d]

- A.** The Permittee shall submit a compliance certification to the Director semiannually which describes the compliance status of the source with respect to each permit condition. The first certification shall be submitted no later than May 15th, and shall report the compliance status of the source during the period between October 1st of the previous year and March 31st of the current year. The second certification shall be submitted no later than November 15th, and shall report the compliance status of the source during the period between April 1st and September 30th of the current year.

The compliance certifications shall include the following:

1. Identification of each term or condition of the permit that is the basis of the certification;
2. Identification of the methods or other means used by the Permittee for determining the compliance status with each term and condition during the certification period, and whether the methods or other means provide continuous or intermittent data;
3. The status of compliance with the terms and conditions of this permit for the period covered by the certification, based on the methods or means designated in Condition VII.A.2 above. The certifications shall identify each deviation and take it into account for consideration in the compliance certification;
4. For emission units subject to 40 CFR Part 64, the certification shall also identify as possible exceptions to compliance any period during which compliance is required and in which an excursion or exceedance defined under 40 CFR Part 64 occurred;
5. All instances of deviations from permit requirements reported pursuant to Condition XII.B of this Attachment; and
6. Other facts the Director may require to determine the compliance status of the source.

- B.** A copy of all compliance certifications shall also be submitted to the EPA Administrator.

- C.** If any outstanding compliance schedule exists, a progress report shall be submitted with the semi-annual compliance certifications required in Condition VII.A above.

VIII. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS

[A.A.C. R18-2-304.H]

Any document required to be submitted by this permit, including reports, shall contain a certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

IX. INSPECTION AND ENTRY

[A.A.C. R18-2-309.4]

Upon presentation of proper credentials, the Permittee shall allow the Director or the authorized representative of the Director to:

- A.** Enter upon the Permittee's premises where a source is located, emissions-related activity is conducted, or where records are required to be kept under the conditions of the permit;
- B.** Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;
- C.** Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;
- D.** Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or other applicable requirements; and
- E.** Record any inspection by use of written, electronic, magnetic and photographic media.

X. PERMIT REVISION PURSUANT TO FEDERAL HAZARDOUS AIR POLLUTANT STANDARD

[A.A.C. R18-2-304.C]

If this source becomes subject to a standard promulgated by the Administrator pursuant to Section 112(d) of the Act, then the Permittee shall, within twelve months of the date on which the standard is promulgated, submit an application for a permit revision demonstrating how the source will comply with the standard.

XI. ACCIDENTAL RELEASE PROGRAM

[40 CFR Part 68]

If this source becomes subject to the provisions of 40 CFR Part 68, then the Permittee shall comply with these provisions according to the time line specified in 40 CFR Part 68.

XII. EXCESS EMISSIONS, PERMIT DEVIATIONS, AND EMERGENCY REPORTING

A. Excess Emissions Reporting

[A.A.C. R18-2-310.01.A and -310.01.B]

- I.* Excess emissions shall be reported as follows:

- a. The Permittee shall report to the Director any emissions in excess of the limits established by this permit. Such report shall be in two parts as specified below:
 - (1) Notification by telephone or facsimile within 24 hours of the time when the Permittee first learned of the occurrence of excess emissions including all available information from Condition XII.A.1.b below.
 - (2) Detailed written notification by submission of an excess emissions report within 72 hours of the notification pursuant to Condition XII.A.1.a.(1) above.
- b. The report shall contain the following information:
 - (1) Identity of each stack or other emission point where the excess emissions occurred;
 - (2) Magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions;
 - (3) Date, time and duration, or expected duration, of the excess emissions;
 - (4) Identity of the equipment from which the excess emissions emanated;
 - (5) Nature and cause of such emissions;
 - (6) If the excess emissions were the result of a malfunction, steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunctions; and
 - (7) Steps taken to limit the excess emissions. If the excess emissions resulted from start-up or malfunction, the report shall contain a list of the steps taken to comply with the permit procedures.

2. In the case of continuous or recurring excess emissions, the notification requirements of this section shall be satisfied if the source provides the required notification after excess emissions are first detected and includes in such notification an estimate of the time the excess emissions will continue. Excess emissions occurring after the estimated time period, or changes in the nature of the emissions as originally reported, shall require additional notification pursuant to Condition XII.A.1 above.

[A.A.C. R18-2-310.01.C]

B. Permit Deviations Reporting

[A.A.C. R18-2-306.A.5.b]

The Permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. Prompt reporting shall mean that the report was submitted to the Director by certified mail, facsimile, or hand delivery within two working days of the time the deviation occurred.

C. Emergency Provision

[A.A.C. R18-2-306.E]

1. An “emergency” means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, that require immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
2. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if Condition XII.C.3 is met.
3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - a. An emergency occurred and that the Permittee can identify the cause(s) of the emergency;
 - b. The permitted facility was being properly operated at the time;
 - c. During the period of the emergency, the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emissions standards or other requirements in the permit; and
 - d. The Permittee submitted notice of the emergency to the Director by certified mail, facsimile, or hand delivery within two working days of the time when emission limitations were exceeded due to the emergency. This notice shall contain a description of the emergency, any steps taken to mitigate emissions, and corrective action taken.
4. In any enforcement proceeding, the Permittee seeking to establish the occurrence of an emergency has the burden of proof.
5. This provision is in addition to any emergency or upset provision contained in any applicable requirement.

D. Compliance Schedule

[ARS § 49-426.I.5]

For any excess emission or permit deviation that cannot be corrected within 72 hours, the Permittee is required to submit a compliance schedule to the Director within 21 days of such occurrence. The compliance schedule shall include a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with the permit terms or conditions that have been violated.

E. Affirmative Defenses for Excess Emissions Due to Malfunctions, Startup, and Shutdown

[A.A.C. R18-2-310]

1. Applicability

This rule establishes affirmative defenses for certain emissions in excess of an emission standard or limitation and applies to all emission standards or limitations except for standards or limitations:

- a. Promulgated pursuant to Sections 111 or 112 of the Act;
- b. Promulgated pursuant to Titles IV or VI of the Clean Air Act;
- c. Contained in any Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permit issued by the U.S. EPA;
- d. Contained in A.A.C. R18-2-715.F; or
- e. Included in a permit to meet the requirements of A.A.C. R18-2-406.A.5.

2. Affirmative Defense for Malfunctions

Emissions in excess of an applicable emission limitation due to malfunction shall constitute a violation. When emissions in excess of an applicable emission limitation are due to a malfunction, the Permittee has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the Permittee has complied with the reporting requirements of A.A.C. R18-2-310.01 and has demonstrated all of the following:

- a. The excess emissions resulted from a sudden and unavoidable breakdown of process equipment or air pollution control equipment beyond the reasonable control of the Permittee;
- b. The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

- c. If repairs were required, the repairs were made in an expeditious fashion when the applicable emission limitations were being exceeded. Off-shift labor and overtime were utilized where practicable to ensure that the repairs were made as expeditiously as possible. If off-shift labor and overtime were not utilized, the Permittee satisfactorily demonstrated that the measures were impracticable;
- d. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;
- e. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;
- f. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;
- g. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in Title 18, Chapter 2, Article 2 of the Arizona Administrative Code that could be attributed to the emitting source;
- h. The excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned, and could not have been avoided by better operations and maintenance practices;
- i. All emissions monitoring systems were kept in operation if at all practicable; and
- j. The Permittee's actions in response to the excess emissions were documented by contemporaneous records.

3. *Affirmative Defense for Startup and Shutdown*

- a. Except as provided in Condition XII.E.3.b below, and unless otherwise provided for in the applicable requirement, emissions in excess of an applicable emission limitation due to startup and shutdown shall constitute a violation. When emissions in excess of an applicable emission limitation are due to startup and shutdown, the Permittee has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the Permittee has complied with the reporting requirements of A.A.C. R18-2-310.01 and has demonstrated all of the following:
 - (1) The excess emissions could not have been prevented through careful and prudent planning and design;

- (2) If the excess emissions were the result of a bypass of control equipment, the bypass was unavoidable to prevent loss of life, personal injury, or severe damage to air pollution control equipment, production equipment, or other property;
 - (3) The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;
 - (4) The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;
 - (5) All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;
 - (6) During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in Title 18, Chapter 2, Article 2 of the Arizona Administrative Code that could be attributed to the emitting source;
 - (7) All emissions monitoring systems were kept in operation if at all practicable; and
 - (8) The Permittee's actions in response to the excess emissions were documented by contemporaneous records.
- b. If excess emissions occur due to a malfunction during routine startup and shutdown, then those instances shall be treated as other malfunctions subject to Condition XII.E.2 above.

4. *Affirmative Defense for Malfunctions During Scheduled Maintenance*

If excess emissions occur due to a malfunction during scheduled maintenance, then those instances will be treated as other malfunctions subject to Condition XII.E.2 above.

5. *Demonstration of Reasonable and Practicable Measures*

For an affirmative defense under Condition XII.E.2 or XII.E.3 above, the Permittee shall demonstrate, through submission of the data and information required by Condition XII.E and A.A.C. R18-2-310.01, that all reasonable and practicable measures within the Permittee's control were implemented to prevent the occurrence of the excess emissions.

XIII. RECORD KEEPING REQUIREMENTS

[A.A.C. R18-2-306.A.4]

- A. The Permittee shall keep records of all required monitoring information including, but not limited to, the following:
1. The date, place as defined in the permit, and time of sampling or measurements;
 2. The date(s) analyses were performed;
 3. The name of the company or entity that performed the analyses;
 4. A description of the analytical techniques or methods used;
 5. The results of such analyses; and
 6. The operating conditions as existing at the time of sampling or measurement.
- B. The Permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings or other data recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.
- C. All required records shall be maintained either in an unchangeable electronic format or in a handwritten logbook utilizing indelible ink.

XIV. REPORTING REQUIREMENTS

[A.A.C. R18-2-306.A.5.a]

The Permittee shall submit the following reports:

- A. Compliance certifications in accordance with Section VII of Attachment "A".
- B. Excess emission, permit deviation, and emergency reports in accordance with Section XII of Attachment "A".
- C. Other reports required by any condition of Attachment "B".

XV. DUTY TO PROVIDE INFORMATION

[A.A.C. R18-2-304.G and -306.A.8.e]

- A. The Permittee shall furnish to the Director, within a reasonable time, any information that the Director may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the Permittee shall also furnish to the Director copies of records required to be kept by the permit. For information claimed to be confidential, the Permittee shall furnish an additional copy of such records directly to the Administrator along with a claim of confidentiality.

- B.** If the Permittee has failed to submit any relevant facts or has submitted incorrect information in the permit application, the Permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information.

XVI. PERMIT AMENDMENT OR REVISION

[A.A.C. R18-2-318, -319, and -320]

The Permittee shall apply for a permit amendment or revision for changes to the facility which do not qualify for a facility change without revision under Section XVII, as follows:

- A.** Administrative Permit Amendment (A.A.C. R18-2-318);
- B.** Minor Permit Revision (A.A.C. R18-2-319); and
- C.** Significant Permit Revision (A.A.C. R18-2-320).

The applicability and requirements for such action are defined in the above referenced regulations.

XVII. FACILITY CHANGE WITHOUT A PERMIT REVISION

[A.A.C. R18-2-306.A.4 and -317]

- A.** The Permittee may make changes at the permitted source without a permit revision if all of the following apply:
 - 1.** The changes are not modifications under any provision of Title I of the Act or under ARS § 49-401.01(19);
 - 2.** The changes do not exceed the emissions allowable under the permit whether expressed therein as a rate of emissions or in terms of total emissions;
 - 3.** The changes do not violate any applicable requirements or trigger any additional applicable requirements;
 - 4.** The changes satisfy all requirements for a minor permit revision under A.A.C. R18-2-319.A; and
 - 5.** The changes do not contravene federally enforceable permit terms and conditions that are monitoring (including test methods), record keeping, reporting, or compliance certification requirements.
- B.** The substitution of an item of process or pollution control equipment for an identical or substantially similar item of process or pollution control equipment shall qualify as a change that does not require a permit revision, if it meets all of the requirements of Conditions XVII.A and XVII.C of this Attachment.
- C.** For each change under Conditions XVII.A and XVII.B above, a written notice by certified mail or hand delivery shall be received by the Director and the Administrator a minimum of 7 working days in advance of the change. Notifications of changes associated with

emergency conditions, such as malfunctions necessitating the replacement of equipment, may be provided less than 7 working days in advance of the change, but must be provided as far in advance of the change as possible or, if advance notification is not practicable, as soon after the change as possible.

D. Each notification shall include:

1. When the proposed change will occur;
2. A description of the change;
3. Any change in emissions of regulated air pollutants; and
4. Any permit term or condition that is no longer applicable as a result of the change.

E. The permit shield described in A.A.C. R18-2-325 shall not apply to any change made to Conditions XVII.A and XVII.B above.

F. Except as otherwise provided for in the permit, making a change from one alternative operating scenario to another as provided under A.A.C. R18-2-306.A.11 shall not require any prior notice under this Section.

G. Notwithstanding any other part of this Section, the Director may require a permit to be revised for any change that, when considered together with any other changes submitted by the same source under this Section over the term of the permit, do not satisfy Condition XVII.A above.

XVIII. TESTING REQUIREMENTS

[A.A.C. R18-2-312]

A. The Permittee shall conduct performance tests as specified in the permit and at such other times as may be required by the Director.

B. Operational Conditions During Testing

Tests shall be conducted during operation at the maximum possible capacity of each unit under representative operational conditions unless other conditions are required by the applicable test method or in this permit. With prior written approval from the Director, testing may be performed at a lower rate. Operations during periods of start-up, shutdown, and malfunction (as defined in A.A.C. R18-2-101) shall not constitute representative operational conditions unless otherwise specified in the applicable standard.

C. Tests shall be conducted and data reduced in accordance with the test methods and procedures contained in the Arizona Testing Manual unless modified by the Director pursuant to A.A.C. R18-2-312.B.

D. Test Plan

At least 14 calendar days prior to performing a test, the Permittee shall submit a test plan to the Director in accordance with A.A.C. R18-2-312.B and the Arizona Testing Manual. This test plan must include the following:

1. Test duration;
2. Test location(s);
3. Test method(s); and
4. Source operation and other parameters that may affect test results.

E. Stack Sampling Facilities

The Permittee shall provide, or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to the facility;
2. Safe sampling platform(s);
3. Safe access to sampling platform(s); and
4. Utilities for sampling and testing equipment.

F. Interpretation of Final Results

Each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic mean of the results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs is required to be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the Permittee's control, compliance may, upon the Director's approval, be determined using the arithmetic mean of the results of the other two runs. If the Director or the Director's designee is present, tests may only be stopped with the Director's or such designee's approval. If the Director or the Director's designee is not present, tests may only be stopped for good cause. Good cause includes: forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond the Permittee's control. Termination of any test without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation which demonstrates good cause must be submitted.

G. Report of Final Test Results

A written report of the results of all performance tests shall be submitted to the Director within 30 days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312.A.

XIX. PROPERTY RIGHTS

[A.A.C. R18-2-306.A.8.d]

This permit does not convey any property rights of any sort, or any exclusive privilege.

XX. SEVERABILITY CLAUSE

[A.A.C. R18-2-306.A.7]

The provisions of this permit are severable. In the event of a challenge to any portion of this permit, or if any portion of this permit is held invalid, the remaining permit conditions remain valid and in force.

XXI. PERMIT SHIELD

[A.A.C. R18-2-325]

Compliance with the conditions of this permit shall be deemed compliance with all applicable requirements identified in the portions of this permit subtitled "Permit Shield". The permit shield shall not apply to minor revisions pursuant to Condition XVI.B of this Attachment and any facility changes without a permit revision pursuant to Section XVII of this Attachment.

XXII. PROTECTION OF STRATOSPHERIC OZONE

[40 CFR Part 82]

If this source becomes subject to the provisions of 40 CFR Part 82, then the Permittee shall comply with these provisions accordingly.

XXIII. APPLICABILITY OF NSPS GENERAL PROVISIONS

[40 CFR 60 Subpart A]

For all equipment subject to a New Source Performance Standard, the Permittee shall comply with all applicable requirements contained in Subpart A of Title 40, Chapter 60 of the Code of Federal Regulations.

ATTACHMENT “B”: SPECIFIC CONDITIONS

Air Quality Control Permit No. 1001532

for

Caithness Big Sandy

I. RELATIONSHIP OF PERMIT TO APPLICABLE STATE IMPLEMENTATION PLAN

[ARS § 49-404.c and -426]

This permit is issued pursuant to the provisions of the Arizona Revised Statutes (ARS) and constitutes an Installation Permit for the purpose of the applicable State Implementation Plan.

II. FACILITY WIDE LIMITATIONS

A. Facility Emission Limitations/Standards

[A.A.C. R18-2-306.01.A]

1. *Particulate Matter Less than 10 Microns (PM_{10})*

The Permittee shall not cause to be discharged into the atmosphere from all equipment at the facility, including emissions generated during gas turbine start-ups and shutdowns as well as emissions from the emergency equipment, PM_{10} emissions in excess of 202.2 tons per year on a 365-day rolling average.

2. *Nitrogen Oxide (NO_x)*

The Permittee shall not cause to be discharged into the atmosphere from all equipment at the facility, including emissions generated during gas turbine start-ups and shutdowns as well as emissions from the emergency equipment, NO_x emissions in excess of 303.1 tons per year on a 365-day rolling average.

3. *Carbon Monoxide (CO)*

The Permittee shall not cause to be discharged into the atmosphere from all equipment at the facility, including emissions generated during gas turbine start-ups and shutdowns as well as emissions from the emergency equipment, CO emissions in excess of 118.6 tons per year on a 365-day rolling average.

B. Operating Limitations

1. *Stack Limitation*

[A.A.C. R18-2-306.01 and -331.A.3.a]

Material Permit Conditions are indicated with underline and italics.

The exhaust stacks for each Stage I Combined Cycle System (EU#1 and EU#2) shall be at least 150 feet in height above ground and the exhaust stack for the Stage II Combined Cycle System (EU#3) shall be at least 165 feet in height

above ground.

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2. *Construction Requirement* [A.A.C. R18-2-402.D.4]

The Director shall terminate this permit, if the proposed construction is not begun within 18 months of permit issuance or, if during the construction, work is suspended for more than 18 months.

3. The Permittee shall operate and maintain all equipment at the facility in accordance with the manufacturer's specifications. [A.A.C. R18-2-306.A.2]

C. Monitoring Requirements [A.A.C. R18-2-306.A.2]

Prior to commencing construction, the Permittee shall have on-site or on-call a person that is certified in EPA Reference Method 9 for the observation and evaluation of visible emissions.

D. Record Keeping Requirements [A.A.C. R18-2-306.A.4]

1. The Permittee shall maintain on-site records of the manufacturer's specifications for all equipment.
2. The Permittee shall maintain daily records of the total PM₁₀, NO_x, and CO emissions from the facility.
3. All records, analyses, and reports shall be retained for a minimum of five years from the date of generation. The most recent two years of data shall be kept on-site.

E. Reporting Requirements [A.A.C. R18-2-306.A.5]

1. Within 30 days after commencing construction, the Permittee shall submit a notice of the date of the commencement of construction of Stage I and Stage II to the Department.
2. The Permittee shall submit reports of all monitoring activities required in Attachment "B" along with the compliance certifications required by Section VII of Attachment "A".

III. COMBUSTION TURBINE GENERATORS AND HEAT RECOVERY STEAM GENERATORS

A. Applicability

1. This Section applies to Combustion Turbine Generator (CTG) Units 1, 2, and 3, and Heat Recovery Steam Generator (HRSG) Units 1, 2, and 3.
2. The emission limits and operational limitations presented in this Section apply to each individual CTG and HRSG stack in the combined cycle operation.

B. Operational Limitations

1. *Start-up and Shutdown Requirements* [A.A.C. R18-2-306.01 and -331.A.3.a]
Material Permit Conditions are indicated with underline and italics.

a. *Applicability*

- (1) Start-up means the setting in operation of a combustion turbine up to the point of achieving a 75 percent load.
- (2) Shutdown means the point where the combustion turbine load falls below 75 percent to a point where the fuel supply can be cut off from the unit.

b. *The Permittee shall not cause, allow, or permit each start-up period (from first fuel firing until achieving 75 percent load) to exceed four hours.*

c. *The Permittee shall not cause, allow, or permit the total operating time during periods of start-up and shutdown conditions to exceed 341 hours per year on a rolling 365-day sum for each unit.*

2. *Duct Firing Requirement* [A.A.C. R18-2-306.01 and -331.A.3.a]
Material Permit Conditions are indicated with underline and italics.

The Permittee shall not cause, allow, or permit the total operating time with duct firing to exceed 4,000 hours for each HRSG on a rolling 365-day sum.

3. *Fuel Limitations* [A.A.C. R18-2-306.01]

- a. The Permittee shall only burn pipeline quality natural gas in the turbines and duct burners.
- b. The sulfur content of the natural gas shall not exceed 0.75 grains/100 dscf.

C. Emission Limitations/Standards

1. *Particulate Matter*

- a. The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain PM₁₀ in excess of any of the following limits: 16.5 lb/hr without duct burner firing or 18.0 lb/hr with duct burner firing, based on a 3-hour averaging time, derived from the high heating value of the natural gas. [A.A.C. R18-2-406A.4]

- b. *Opacity Standard* [A.A.C. R18-2-306.01]

The Permittee shall not cause, allow, or permit to be discharged into the atmosphere from the stack of each unit any plume or effluent the opacity of which exceeds 10 percent, based on a 6-minute averaging time.

2. *Nitrogen Oxide*

- a. The Permittee shall install, operate, and maintain a selective catalytic reduction (SCR) system as part of each turbine and duct burner pair. For the first two years of operation, starting on the date of initial startup, emissions of NO_x from each power train shall not exceed 17.0 lb/hr (based on 2.5 ppmvd at 15% O₂, on a one-hour average), excluding startup and shutdown periods as defined in Condition III.C.2.c below. After the first two years of operation, emissions of NO_x shall not exceed 2.0 ppmvd at 15% O₂, on a one-hour average, excluding startup and shutdown periods as defined in Condition III.C.2.c below. The demonstration shall provide all supporting documentation demonstrating the facility's inability to meet the 2.0 ppmvd limit despite proper operation and maintenance of the SCR system. The Permittee must then submit the demonstration in a written request to the Director prior to the two year anniversary of operation seeking a change from the 2.0 ppmvd limit and stating the suggested new limit. If the Director concludes that the demonstration is acceptable, the Director shall set a new NO_x emission limit at a level that they believe the Permittee can consistently and reasonably meet based upon their evaluation of the demonstration report submitted by the Permittee. However, the new emission rate shall not exceed 2.5 ppmvd at 15% O₂, on a 1-hour average, excluding startup and shutdown periods as defined in Condition III.C.2.c below. [A.A.C. R18-2-406A.4]

- b. To ensure that the SCR system is properly operated to achieve the design control rate of 2.0 ppm NO_x during the first two years of commercial operation, the equivalent anhydrous ammonia injection rate shall not be less than the value calculated as described in Attachment "E" of this permit, measured by the ammonia flowmeter required in Condition III.E.4. After the initial two year period, the final NO_x limit shall be determined, and the minimum ammonia injection rate monitoring requirement shall no longer apply. [A.A.C. R18-2-406A.4]

- c. Start-Up/Shutdown Requirement [A.A.C. R18-2-306.01]

When operating under start-up and shutdown conditions, the Permittee shall not cause to be discharged into the atmosphere from each turbine nitrogen oxide emissions in excess of 194.0 lb/hr averaged over each 1-hour period.

- d. On and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8, whichever date comes first, the Permittee shall not cause to be discharged into the atmosphere from the

duct burners used in the combined cycle systems any gases that contain nitrogen oxides (expressed as NO₂) in excess of 0.20 lb/million Btu heat input. This nitrogen oxide standard applies at all times including periods of start-up, shutdown, and malfunction. Compliance with the emission limit is determined on a 30-day rolling average basis. [A.A.C. R18-2-406A.4]

3. *Carbon Monoxide*

- a. The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain carbon monoxide in excess of any of the following limits: 8.0 lb/hr and 2.5 ppmvd corrected to 15% O₂ without duct burner firing, or 7.75 lb/hr and 2.0 ppmvd corrected to 15% O₂ with duct burner firing, based on a 3-hour averaging time. [A.A.C. R18-2-406A.4]

- b. *Start-Up/Shutdown Requirement*

When operating under start-up and shutdown conditions, the Permittee shall not cause to be discharged into the atmosphere from each turbine carbon monoxide emissions in excess of 103.3 lb/hr averaged over each 1-hour period. [A.A.C. R18-2-306.01]

4. *Sulfur Dioxide*

[A.A.C. R18-2-306.01]

The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain sulfur dioxide in excess of the following limit: 3.1 lb/hr, based on a 3-hour averaging time. The Permittee shall calculate SO₂ emissions in accordance with 40 CFR 75 Appendix D, "SO₂ Mass Emissions Calculation for Gaseous Fuels," Section 3.3.2.

5. *Volatile Organic Compounds*

[A.A.C. R18-2-306.01]

The Permittee shall not cause to be discharged into the atmosphere from the stack of each unit any gases which contain volatile organic compounds in excess of any of the following limits: 2.75 lb/hr and 1.5 ppmvd corrected to 15% O₂ without duct burner firing, or 3.45 lb/hr and 1.6 ppmvd corrected to 15% O₂ with duct burner firing, based on a 3-hour averaging time.

6. *Ammonia*

[A.A.C. R18-2-306.01]

- a. The Permittee shall not allow the emissions of ammonia (slippage) from each unit to exceed 7.5 ppmvd corrected to 15% O₂, based on a 24-hour averaging time.
- b. The Permittee shall develop and submit a Risk Management Plan pursuant to Section 112(r) of the Clean Air Act (CAA) if the ammonia storage capacity exceeds the threshold quantity as defined in Section 112(r) of the

CAA.

D. Air Pollution Control Requirements

[A.A.C. R18-2-306.01, -331.A.3.d-e and -406.A.1]

Material Permit Conditions are indicated with underline and italics.

1. *At all times, including periods of start-up, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate the Low-NO_x Burners, SCR system, and oxidation catalyst system in a manner consistent with good air pollution control practice for minimizing NO_x, CO, and VOC emissions.*
2. *SCR System Requirements*
 - a. *The SCR system shall be designed to meet a NO_x emission limit of no more than 2.0 ppmvd, corrected to 15% O₂, based on a 1-hour rolling average (NO_x demonstration limit), for the life of the SCR catalyst during all operational modes. The SCR system must be guaranteed by the SCR vendor to meet the NO_x demonstration limit. For a period of two years commencing from the date of initial start-up, the Permittee shall install, operate, and maintain the SCR system in a manner designed to achieve the NO_x demonstration limit, and in conformance with the SCR vendor's installation, operation, and maintenance procedures.*
 - b. *The SCR system shall be designed so it will not inject ammonia into the SCR system when the inlet temperature to the catalyst is less than the minimum catalyst temperature to be established as part of the O&M plan required by Condition III.H.7.b below.*

E. Monitoring Requirements

1. *Continuous Monitoring Systems for Nitrogen Oxides*

[A.A.C. R18-2-331.A.3.c and -333.C]

Material Permit Conditions are indicated with underline and italics.

- a. *The Permittee shall install, calibrate, maintain, and operate continuous monitoring systems (CMS), and record the output of the systems, for measuring emissions of nitrogen oxides and diluent carbon dioxide or oxygen concentration in the exhaust gas streams.*
- b. The continuous monitoring systems for nitrogen oxide emissions and oxygen or carbon dioxide shall meet all applicable requirements of 40 CFR Part 75. This shall include, but shall not be limited to, the following requirements:
 - (1) 40 CFR Part 75, Appendix A, "Specification and Test Procedures."

- (2) 40 CFR Part 75, Appendix B, "Quality Assurance and Quality Control Procedure."
 - (3) Equipment performance requirements at 40 CFR 75.10(b).
 - (4) Hourly operating requirements at 40 CFR 75.10(d).
 - (5) Data reduction requirements at 40 CFR 75.10(d)(1).
 - (6) Missing data substitution requirements at 40 CFR 75.10(d)(3) and 40 CFR Part 75, Subpart D.
 - (7) Certification and re-certification requirements at 40 CFR 75.20.
- c. The Permittee shall comply with all of the applicable record keeping and reporting requirements of 40 CFR Part 75 Subparts F and G, respectively.
2. The Permittee shall install, calibrate, maintain, and operate a flow meter to monitor the unit-specific fuel flow to the combustion turbine generators and the duct burners in accordance with the applicable provisions of 40 CFR 75, Appendix D. [A.A.C. R18-2-331.A.3.c and -333.C]
Material Permit Conditions are indicated with underline and italics.
3. Continuous Monitoring Systems for Carbon Monoxide [A.A.C. R18-2-306.01, -331.A.3.c, and 40 CFR 60.48(b)(1)]
Material Permit Conditions are indicated with underline and italics.
- a. The Permittee shall install, calibrate, maintain, and operate continuous emission monitoring systems (CEMS), and record the output of the systems, for measuring emissions of carbon monoxide.
- b. The CO CEMS requirements shall include, but not be limited to:
- (1) 40 CFR 60, Appendix B, "Performance Specifications," for CO, Performance Specification 4A, "Specifications and test procedures for carbon monoxide CEMS in stationary sources."
 - (2) 40 CFR 60, Appendix F, "Quality Assurance Procedures."
- c. The CO CEMS shall be installed and operational prior to conducting required initial performance tests. Verification of operational status shall, at a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of these devices. [40 CFR 60.13(b)]
- d. The Permittee shall conduct a performance evaluation of the CO CEMS during any performance test required under Condition III.F below, or within

30 days thereafter, in accordance with the applicable performance specifications in Appendix B of 40 CFR 60. The Permittee shall conduct CEMS performance evaluations at such other times as may be required by the Director under Section 114 of the Act.

[40 CFR 60.13(c)]

- e. The Permittee shall check the zero (or low-level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts at least once daily in accordance with a written procedure. The zero and span shall, at a minimum, be adjusted whenever either the 24-hour zero drift or the 24-hour span drift exceeds two times the limits of the applicable performance specifications in Appendix B of 40 CFR 60. The system must allow the amount of the excess zero and span drift measured at the 24-hour interval checks to be recorded and quantified, whenever specified.

[40 CFR 60.13(d)(1)]

- f. Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under Condition III.E.3.e above, all CEMS shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

[40 CFR 60.13(e)]

- (1) The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

[40 CFR 60.13(e)(2)]

- g. All CEMS shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for the location of CEMS contained in the applicable Performance Specifications of Appendix B of 40 CFR 60 shall be used.

[40 CFR 60.13(f)]

- h. For CEMS measurements, compliance shall be based on each rolling continuous 3-hour period using data collected at least once every 15 minutes. Data recorded during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this condition. Data averages must include any data recorded during periods of monitor breakdown or malfunction. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent O₂ or ng/J of pollutant). All excess emissions shall be converted into the units of the standard using the appropriate conversion procedures. After conversion into the units of the standard, the data may be rounded to the same number of significant digits as the applicable emission limit.

[40 CFR 60.13(h) and A.A.C. R18-2-306.A.3.c]

4. *Ammonia Monitoring*

[A.A.C. R18-2-306.A.3 and -331.A.3.c]

Material Permit Conditions are indicated with underline and italics.

Within 30 days after initial start-up (as defined by 40 CFR 72.2), the Permittee shall install, calibrate, maintain, and operate ammonia flow meters on each SCR unit to monitor the ammonia injection rate. The flow meters will be sampled by a data acquisition system at a frequency of no less than once every 15 minutes and averaged into rolling 24-hour periods.

5. The CMS shall be installed and operational prior to conducting required initial performance tests. Verification of operational status shall, at a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of these devices, and shall be notified to the Department. [40 CFR 60.13(b)]

6. For CMS measurements, the emission limits expressed as pounds per hour or parts per million based on a 3-hour averaging period, compliance shall be based on each rolling continuous 3-hour period using data collected at least once every 15 minutes when compliance is based on continuous emissions monitoring data. For emission limits based on a 1-hour averaging period, compliance shall be based on each rolling continuous 1-hour period using data collected at least once every 15 minutes when compliance is based on continuous emissions monitoring data. [A.A.C. R18-2-306.A.3.c]

7. *Opacity Monitoring*

[A.A.C. R18-2-306.A.3.c]

Upon commencement of operation of the CTGs and HRSGs, a certified EPA Reference Method 9 observer shall perform EPA Reference Method 22-like procedures for one minute daily on the CTG and HRSG stacks. If there are no visible emissions observed for seven consecutive days, then the observations shall be performed weekly. If there are no visible emissions observed for four consecutive weeks, then the observations should be performed monthly. If visible emissions are observed during a weekly or monthly observation, then the frequency reverts back to daily until no visible emissions are observed for seven consecutive days.

F. Testing Requirements

Within 60 days after achieving the maximum production rate of the CTG/HRSGs, but no later than 180 days after initial startup of the equipment (as defined by 40 CFR 60.2), and at other times as may be required by the Director, the Permittee shall conduct performance tests for the pollutants listed below from each unit and for other pollutants that may be required by the Director. The initial performance testing shall be conducted under representative operating conditions, which will include at a minimum 75% and 100% of peak load. [A.A.C. R18-2-312]

1. *CTG/HRSG Units 1, 2, and 3 Operating With Supplemental Duct Firing*

- a. Particulate Matter Less than 10 Microns (PM₁₀)

[A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test, and an annual performance test thereafter, for PM₁₀ on each Combined Cycle System with supplemental duct firing using the procedures of either EPA Reference Method 5 or 201A, and EPA Reference Method 202.

b. Nitrogen Oxides (NO_x)

The Permittee shall conduct an initial performance test, and an annual performance test thereafter (as part of the RATA for the CEMS), for NO_x on each Combined Cycle System with supplemental duct firing using the procedures of EPA Reference Method 20 in accordance with 40 CFR 60.46b(f). [40 CFR 60.8, 40 CFR 60.46b(f)]

c. Carbon Monoxide (CO) [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test, and an annual performance test thereafter (as part of the RATA for the CEMS), for CO on each Combined Cycle System with supplemental duct firing using the procedures of EPA Reference Method 10 or equivalent.

d. Volatile Organic Compounds (VOC) [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test, and an annual performance test thereafter, for VOCs on each Combined Cycle System with supplemental duct firing using the procedures of EPA Reference Method 25a and EPA Reference Method 18 or equivalent. EPA Reference Method 25a shall be used to test for the total gaseous organic concentration. EPA Reference Method 18 shall be used to measure both methane and ethane concentrations. The VOC concentration shall be determined as the total gaseous organic concentration less the methane and ethane concentrations.

e. Sulfur Dioxide (SO₂) [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test for SO₂ on each Combined Cycle System with supplemental duct firing using the procedures of EPA Reference Method 20 or equivalent.

f. Ammonia [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test, and additional performance tests every two years thereafter, for ammonia slippage on each Combined Cycle System with supplemental duct firing using methods approved by the Director.

2. *CTG/HRSGs Units 1, 2, and 3 Without Supplemental Duct Firing*

- a. Particulate Matter Less than 10 Microns (PM₁₀) [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test on each Combined Cycle System without supplemental duct firing for PM₁₀. Thereafter, the Permittee shall conduct an annual performance test on each Combined Cycle System without supplemental duct firing for PM₁₀ unless all emission limits in Condition III.C.1.a above are met with supplemental duct firing. The Permittee shall use the procedures of either EPA Reference Method 5 or 201A, and EPA Reference Method 202.

- b. Carbon Monoxide (CO) [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test on each Combined Cycle System without supplemental duct firing for CO. Thereafter, the Permittee shall conduct an annual performance test on each Combined Cycle System without supplemental duct firing for CO unless all emission limits in Condition III.C.3.a above are met with supplemental duct firing. The Permittee shall use the procedures of EPA Reference Method 10.

- c. Volatile Organic Compounds (VOC) [A.A.C. R18-2-312]

The Permittee shall conduct an initial performance test on each Combined Cycle System without supplemental duct firing for VOCs. Thereafter, the Permittee shall conduct an annual performance test on each Combined Cycle System without supplemental duct firing for VOCs unless all emission limits in Condition III.C.5 above are met with supplemental duct firing. The Permittee shall use the procedures of EPA Reference Method 25a and EPA Reference Method 18 or equivalent. EPA Reference Method 25a shall be used to test for the total gaseous organic concentration. EPA Reference Method 18 shall be used to measure both methane and ethane concentrations. The VOC concentration shall be determined as the total gaseous organic concentration less the methane and ethane concentrations.

G. Record Keeping Requirements

1. The Permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by 40 CFR 60 recorded in a permanent form suitable for inspection.

2. The Permittee shall record and maintain records of the amounts of fuel combusted during each day and calculate the annual capacity factor for natural gas for the reporting period. The annual capacity factor is determined on a 12-month rolling average basis with a new annual capacity factor calculated at the end of each calendar month. [40 CFR 60.49b(d)]
3. The Permittee shall maintain records of the following information for each steam generating unit operating day: [40 CFR 60.49b(g)]
 - (a) Calendar date;
 - (b) The average hourly nitrogen oxides emission rates (expressed as NO₂) (ng/J or lb/million Btu heat input) measured;
 - (c) The 30-day average nitrogen oxides emission rates (ng/J or lb/million Btu heat input) calculated at the end of each steam generating unit operating day from the measured hourly nitrogen oxide emission rates for the preceding 30 steam generating unit operating days;
 - (d) Identification of the steam generating unit operating days for which pollutant data have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken;
 - (e) Identification of the times when emission data have been excluded from the calculation of average emission rates and the reasons for excluding data;
 - (f) Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system;
 - (g) Description of any modifications to the continuous monitoring system that could affect the ability of the continuous monitoring system to comply with Performance Specification 2 or 3; and
 - (h) Results of daily CEMS drift tests and quarterly accuracy assessments as required under Appendix F, Procedure 1 of 40 CFR 60.
4. The Permittee shall record the daily hours of operation, in hours and minutes, and operating mode (start-up, shutdown, normal, and duct firing) for each Combined Cycle System. The Permittee shall also calculate the rolling 365-day total hours of operation in each mode for each Combined Cycle System.

[A.A.C. R18-2-306.A.4]

5. The Permittee shall maintain records of any periods during which a continuous monitoring system or device is inoperative. [A.A.C. R18-2-306.A.4]
6. The Permittee shall maintain records of all start-ups and shutdowns. Records shall contain, at a minimum, the type of start-up (cold, warm, or hot), the dates and times of each start-up, and the duration of each start-up in hours and [A.A.C. R18-2-306.A.4]
7. *Fuel Requirements* [A.A.C. R18-2-306.A.4]
 - a. The Permittee shall maintain a vendor-provided copy of the part of the Federal Energy Regulatory Commission (FERC)-approved tariff agreement that contains the sulfur content and the lower heating value of the pipeline quality natural gas.
 - b. The Permittee shall maintain a daily record of the amount of natural gas combusted in each of the Combined Cycle Systems.
8. The Permittee shall maintain a log of the observations required in Condition III.E.8 above which includes the observer's name, date, time, location, description of the visual background during the observations, and result of the observation. [A.A.C. R18-2-306.A.4]
9. The Permittee shall, at all times, comply with the currently approved version of the O&M plan required by Condition III.H.7.b below. [A.A.C. R18-2-306.A.4]

H. Reporting Requirements

1. The Permittee shall notify the Department of the verification of operational status of all continuous monitoring systems including the information required in Condition III.E.3.c above. [40 CFR 60.13(b)]
2. The Permittee shall furnish the Director within 60 days of completion, two, or more upon request, copies of a written report of the results of the performance evaluation. [40 CFR 60.13(c)(2)]
3. The Permittee shall notify the Director in writing within 30 days after any change to the FERC-approved tariff agreement relating to the sulfur content or lower heating value limits that occur during the term of this permit. [A.A.C. R18-2-306.A.5]
4. Excess emission and monitoring system performance (MSP) reports for CTG (Units 1, 2, and 3) and HRSG (Units 1, 2, and 3) shall be submitted to the Department and

EPA Region IX for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter. Each excess emission and MSP report shall include the information required in conditions III.E.1 through III.E.4 of this Attachment.

[40 CFR 60.7(c)]

5. The Permittee shall submit notification of the date of initial start-up, as provided by 40 CFR 60.7. This notification shall include: [40 CFR 60.49b(a)]

- (a) The design heat input capacity of the steam generating unit and identification of the fuels to be combusted in the steam generating unit; and
- (b) The annual capacity factor at which the Permittee anticipates operating the facility based on all fuels fired and based on each individual fuel fired.

6. Within 30 days, the Permittee shall submit to the Director the performance test data from the initial performance test and the performance evaluation of the CEMS using the applicable performance specifications in Appendix B of 40 CFR 60.49b(b) [40 CFR 60.49b(b)]

7. *Selective Catalytic Reduction (SCR) and NO_x Demonstration Requirements*

[A.A.C. R18-2-306.A.5]

- a. To help demonstrate the appropriate installation, operation, and maintenance of the SCR system to meet the demonstration limit, the Permittee shall submit the following to the Director in the indicated time-frames:

- (1) Within 10 business days of their availability to the Permittee, copies of the complete design specifications of the SCR system.
- (2) At least one month prior to the date of initial start-up, an SCR operating plan outlining how the Permittee will ensure that the SCR system will be operated and maintained in a manner that ensures compliance with the NO_x demonstration limit. The SCR operating plan shall include recordkeeping provisions requiring the Permittee to document all operation, maintenance, and inspection activities for the SCR system.
- (3) On a semi-annual basis, reports of the system's performance covering the period since the last report. Each report shall include at a minimum:

- (a) Daily NO_x CEMS data;

- (b) Daily fuel flow rate data;
 - (c) Daily gas stream flow rate and temperature data (flow going into the duct-burning system, and flow before and after the SCR system); and
 - (d) Daily gas steam pressure drop across the SCR system.
- b. The Permittee shall submit an approvable Operations and Maintenance (O&M) plan to the Department for each SCR system required by these permit conditions. The plans shall be in a format acceptable to the Department and shall specify the procedures used to maintain the SCR system. The O&M plan shall be submitted within 30 days after the equipment covered has been started up.
8. The Permittee shall comply with all of the applicable reporting requirements of 40 CFR 60 and 40 CFR 75. [A.A.C. R18-2-306.A.5]

I. Permit Shield

Compliance with the terms of Section III of this Attachment shall be deemed compliance with the following applicable requirements: 40 CFR 60.44b(a)(4)(i), 40 CFR 60.44b(h), 40 CFR 60.44b(i), 40 CFR 60.46b(a), 40 CFR 60.46b(c), 40 CFR 60.46b(f), 40 CFR 60.48b(1), 40 CFR 60.49b(a), 40 CFR 60.49b(b), 40 CFR 60.49b(d), 40 CFR 60.49b(g), 40 CFR 60.334(b), 40 CFR 60.335(d), and 40 CFR 60.335(e).

IV. MECHANICAL-DRAFT COOLING TOWERS

A. Applicability

- 1. This Section applies to Stage I (8-cells) and Stage II (4-cells) Mechanical-Draft Cooling Towers.
- 2. The emission limits presented in this Section apply to each Stage I and Stage II Mechanical-Draft Cooling Tower at the facility.

B. Emission Limitations/Standards

- 1. *Particulate Matter* [A.A.C. R18-2-406A.4]
 - a. The Permittee shall not cause to be discharged into the atmosphere from the Stage I mechanical-draft cooling tower any gases which contain

particulate matter in excess of any of the following limits: 3.25 lb/hr or 0.25 lb/million gallons of circulating water flow.

- b. The Permittee shall not cause to be discharged into the atmosphere from the Stage II mechanical-draft cooling tower any gases which contain particulate matter in excess of any of the following limits: 1.22 lb/hr or 0.25 lb/million gallons of circulating water flow.

- c. Opacity Standard

The Permittee shall not cause, allow or permit to be emitted into the atmosphere from each of the mechanical-draft cooling towers any plume or effluent the opacity of which exceeds 5 percent, based on a 6-minute averaging time.

C. Operating Limitations

- 1. *Stage I Mechanical-Drift Cooling Tower* [A.A.C. R18-2-406A.4]

- a. The Permittee shall not cause, allow, or permit the circulating water flow rate in the Stage I mechanical-draft cooling tower to exceed 219,000 gallons per minute, total for the eight cells, based on a 60-minute average.
- b. The Permittee shall not cause, allow, or permit the total dissolved solids of the circulating water in the Stage I mechanical-draft cooling tower to exceed 5,932 ppm.

- 2. *Stage II Mechanical-Drift Cooling Towers* [A.A.C. R18-2-406A.4]

- a. The Permittee shall not cause, allow, or permit the circulating water flow rate in the Stage II mechanical-draft cooling tower to exceed 82,125 gallons per minute, total for the four cells, based on a 60-minute average.
- b. The Permittee shall not cause, allow, or permit the total dissolved solids of the circulating water in the Stage II mechanical-draft cooling tower to exceed 5,932 ppm.

D. Air Pollution Requirements

[A.A.C. R18-2-331.A.3.d-e and -406.A.4]

Material Permit Conditions are indicated with underline and italics.

- 1. *The Permittee shall ensure that the mechanical-draft cooling towers are equipped with drift eliminators such that the guaranteed design total drift rate*

does not exceed 0.0005 percent of circulating water flow.

2. At all times, including periods of startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate the high efficiency drift eliminator systems in a manner consistent with good air pollution control practice for minimizing particulate matter emissions.

E. Monitoring Requirements

[A.A.C. R18-2-306.A.3.c and -406.A.4]

1. Upon commencement of operation of the cooling towers, a certified EPA Reference Method 9 observer shall perform EPA Reference Method 22-like procedures for one minute daily on the mechanical-draft cooling towers. If there are no visible emissions observed for seven consecutive days, then the observations shall be performed weekly. If there are no visible emissions observed for four consecutive weeks, then the observations shall be performed monthly. If visible emissions are observed during a weekly or monthly observation, then the frequency reverts back to daily until no visible emissions are observed for seven consecutive days.
2. The Permittee shall install a monitor on the mechanical-draft cooling towers and shall continuously monitor the circulating water flow rate.
3. The Permittee shall inspect the mechanical-draft cooling tower drift eliminators for proper installation, maintenance, and operation on a monthly basis.
4. The Permittee shall monitor the conductivity of the mechanical-draft cooling tower water daily, and shall measure the Total Dissolved Solids (TDS) of the circulating water used in each of the mechanical-draft cooling towers once per month. Solids measurement shall be performed using EPA Method 160.3 (in *Methods for the Chemical Analysis of Water and Wastes*. EPA-600/4-79-020. U.S. EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, Ohio).

F. Record Keeping Requirements

[A.A.C. R18-2-306.A.4]

1. The Permittee shall record the results of the monitoring of the conductivity of the mechanical-draft cooling tower water daily and the measured amount of Total Dissolved Solids (TDS) of the circulating water used in each of the mechanical-draft cooling towers once per month.
2. The Permittee shall continuously record the 60-minute average circulating water flow rate in each of the mechanical-draft cooling towers.
3. The Permittee shall maintain a log of the observations required in Condition IV.E.1 above which includes the observer's name, date, time, location, description of the visual background during the observations, and result of the observations.

4. The Permittee shall maintain a log of the results of the inspections required in Condition IV.E.3 above including the inspector's name, date, time, and any corrective actions taken.

V. EMERGENCY GENERATOR/FIRE PUMP ENGINE

A. Emission Limitations/Standards

1. Particulate Matter

[A.A.C. R18-2-719.C.1 and -719.J]

- a. The Permittee shall not cause, allow or permit the emission of particulate matter from the emergency generator and fire pump engine in excess of the amounts calculated by the following equation:

$$E = 1.02Q^{0.769}$$

where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour

Q = the heat input in million Btu per hour

- b. *Opacity Standard*

The Permittee shall not cause, allow, or permit to be discharged into the atmosphere any plume from the emergency generator and fire pump engine which exhibit an opacity greater than 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes.

2. Fuel Limitations

[A.A.C. R18-2-306.01]

- a. The Permittee shall only burn diesel fuel in the emergency generator and fire pump engine.
- b. The Permittee shall not burn high sulfur diesel fuel (sulfur content greater than 0.8 weight %) in the emergency generator and fire pump engine.

B. Operational Limitations

[A.A.C. R18-2-306.01]

1. The capacity of the fire pump engine and emergency generator shall each not exceed 1,341 horsepower.
2. The Permittee shall not cause, allow, or permit the fire pump engine and emergency generator combined hours of operation to exceed 1,000 operating hours per year, based on a daily rolling 365-day sum. [A.A.C. R18-2-306.01.A]

C. Monitoring Requirement

[A.A.C. R18-2-306.A.3.a]

Upon commencement of operation of the emergency generator and fire pump engine, an EPA Reference Method 9 or Method 22 observation, whichever is more appropriate, shall be conducted for the emergency equipment by a certified EPA Reference Method 9 observer once per quarter. If the emergency equipment did not operate during a certain quarter, the Permittee shall note that in the log required in Condition V.D.3 below.

D. Record Keeping Requirements

[A.A.C. R18-2-306.A.4]

1. The Permittee shall maintain records of the reason for operating either the fire pump engine or the emergency generator and the hours of operation, including the date and start up and shutdown time in hours and minutes, on a daily rolling 365-day sum.
2. The Permittee shall maintain records of fuel supplier specifications which verify the sulfur content of the fuel is less than the limit specified in Condition V.A.2.b above.
3. The Permittee shall maintain a log of the observations required in Condition V.C above which includes the observer's name, date, time, location, description of the visual background during the observations, and result of the observations.
4. The Permittee shall maintain a plate on the emergency generator and fire pump engine which shows the maximum horsepower rating.

E. Permit Shield

Compliance with the terms of Section V of this Attachment shall be deemed compliance with the following applicable requirements: A.A.C. R18-2-719.C.1 and A.A.C. R18-2-719.J.

VI. SULFURIC ACID AND SODIUM HYDROXIDE TANKS

A. Operating Limitation

[A.A.C. R18-2-730.F]

The Permittee shall process, store, use, and transport materials including solvents or volatile compounds in such a manner and by such means that they will not evaporate, leak, escape, or be otherwise discharged into the atmosphere so as to cause or contribute to air pollution. Where means are available to reduce effectively the contribution to air pollution from evaporation, leakage, or discharge, the installation and usage of such control methods, devices, or equipment shall be mandatory.

B. Permit Shield

Compliance with the terms of Section VI of this Attachment shall be deemed compliance with the following applicable requirements: A.A.C. R18-2-730.F.

VII. NON-POINT SOURCE REQUIREMENTS

A. Applicability

This section applies to any source of air contaminants which, due to lack of an identifiable emission point or plume, cannot be considered a point source.

B. Emission Limitations

[A.A.C. R18-2-612]

The Permittee shall not cause, allow, or permit visible emissions from any nonpoint source in excess of 40 percent opacity, in accordance with EPA Reference Method 9.

C. Operating Limitations

1. Upon initial start-up, all roads, parking lots, and any other areas with frequent vehicular traffic shall be paved. [A.A.C. R18-2-306.01 and -331.A.3.a]

Material Permit Conditions are indicated with underline and italics.

2. *Infrequently Used Roads* [A.A.C. R18-2-306.01]

Service or maintenance roads that are used infrequently shall be graveled or otherwise treated with dust suppressants, adhesive soil stabilizer, or wetting agents to control dust. Infrequently used roads include those which provide access to and around the brine disposal pond, the fuel gas metering station, the transmission lines, and the construction heavy equipment haul road.

3. *Open Areas, Dry Washes, or Riverbeds* [A.A.C. R18-2-604.A and -604.B]

- a. The Permittee shall not cause, allow, or permit a building or its appurtenances, or a building or subdivision site, or a driveway, or a parking area, or a vacant lot or sales lot, or an urban or suburban open area to be constructed, used, altered, repaired, demolished, cleared, or leveled, or the earth to be moved or excavated without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne.
- b. Dust and other types of air contaminants shall be kept to a minimum by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means.
- c. The Permittee shall not cause, allow, or permit a vacant lot, or an urban or suburban open area, to be driven over or used by motor vehicles, trucks, cars, cycles, bikes, or buggies, or by animals such as horses, without taking reasonable precautions to limit excessive amounts of particulates from becoming airborne.

4. *Roadways and Streets*

[A.A.C. R18-2-605]

- a. The Permittee shall not cause, allow, or permit the use, repair, construction or reconstruction of a roadway or alley without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Dust and other particulates shall be kept to a minimum by employing temporary paving, dust suppressants, wetting down, detouring or by other reasonable means.
- b. The Permittee shall not cause, allow, or permit transportation of materials likely to give rise to airborne dust without taking reasonable precautions, such as wetting, applying dust suppressants, or covering the load, to prevent particulate matter from becoming airborne. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or by other means.

5. *Open Burning*

[A.A.C. R18-2-602]

Except as provided in A.A.C. R18-2-602.C(1), C(3), and C(4), and except when permitted to do so by either ADEQ or the local officer delegated the authority for issuance of open burning permits, the Permittee shall not conduct open burning.

D. Monitoring Requirements

[A.A.C. R18-2-306.A.3.a]

Upon commencement of construction at the facility, an EPA Reference Method 9 or Method 22 observation, whichever is more appropriate, shall be conducted for the non-point sources

by a certified EPA Reference Method 9 observer each month.

E. Record Keeping Requirements

[A.A.C. R18-2-306.A.4]

1. The Permittee shall maintain records of the dates on which any of the activities listed in Condition VII.C above were performed and all control measures which were employed.
2. The Permittee shall maintain copies of all open burning permits on file.
3. The Permittee shall maintain a log of the observations required in Condition VII.D above which includes the observer's name, date, time, location, description of the visual background during the observations, and result of the observations.

F. Permit Shield

Compliance with the terms of Section VII of this Attachment shall be deemed compliance with the following applicable requirements: A.A.C. R18-2-602, A.A.C. R18-2-604.A, A.A.C. R18-2-604.B, A.A.C. R18-2-605, and A.A.C. R18-2-612.

VIII. MOBILE SOURCE REQUIREMENTS

A. Applicability

[A.A.C. R18-2-801]

The requirements of this condition are applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization, but which are not classified as motor vehicles, agricultural vehicles, or agricultural equipment used in normal farm operations. Mobile sources shall not include portable sources as defined in A.A.C. R18-2-101.84.

B. Emission Limitation

[A.A.C. R18-2-804.A]

The Permittee shall not cause, allow, or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes.

C. Operating Limitation

[A.A.C. R18-2-804.B]

The Permittee shall not cause, allow, or permit the cleaning of any site, roadway, or alley without taking reasonable precautions to prevent particulate matter from becoming airborne.

Reasonable precautions may include applying dust suppressants. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or by other means.

D. Monitoring Requirements

[A.A.C. R18-2-306.A.3.a]

Upon commencement of construction at the facility, an EPA Reference Method 9 or Method 22 observation, whichever is more appropriate, shall be conducted for the mobile sources by a certified EPA Reference Method 9 observer each month.

E. Record Keeping Requirements

[A.A.C. R18-2-306.A.4]

1. The Permittee shall keep a record of all emissions related maintenance activities performed on the Permittee's mobile sources stationed at the facility.
2. The Permittee shall maintain a log of the observations required in Condition VIII.D above which includes the observer's name, date, time, location, description of the visual background during the observations, and result of the observations.

F. Permit Shield

Compliance with the terms of Section VIII of this Attachment shall be deemed compliance with the following applicable requirements: A.A.C. R18-2-801, A.A.C. R18-2-804.A, and A.A.C. R18-2-804.B.

ATTACHMENT “C”: EQUIPMENT LIST

Air Quality Control Permit No. 1001532

for

Caithness Big Sandy

Equipment ID	Description	Nominal Rating ¹	Serial Number ²	Model	Date of Manufacture ²
CTG 1 ³	Combustion Turbine Generator	180 MW (ISO)	TBD	Siemens V84.3A	TBD
CTG 2 ⁴	Combustion Turbine Generator	180 MW (ISO)	TBD	Siemens V84.3A	TBD
CTG 3 ⁵	Combustion Turbine Generator	180 MW (ISO)	TBD	Siemens V84.3A	TBD
HRSG 1 With Supplemental Firing ^{3,6}	Heat Recovery Steam Generator	103 MMBtu/hr (HHV)	TBD	TBD	TBD
HRSG 2 With Supplemental Firing ^{4,6}	Heat Recovery Steam Generator	103 MMBtu/hr (HHV)	TBD	TBD	TBD
HRSG 3 With Supplemental Firing ^{5,6}	Heat Recovery Steam Generator	103 MMBtu/hr (HHV)	TBD	TBD	TBD
Stage I Cooling Tower (EU#4)	Main Cooling Tower- evaporative	219,000 gal/min total, 8 cells	TBD	TBD	TBD
Stage II Cooling Tower (EU#5)	Main Cooling Tower- evaporative	82,125 gal/min total, 4 cells	TBD	TBD	TBD
Emergency Generator (EU#6)	Diesel-fired Emergency Generator	1341 hp	TBD	TBD	TBD
Fire Pump Engine (EU#7)	Diesel-fired Fire Pump Engine	1341 hp	TBD	TBD	TBD
CTG Low NO _x Burners ³	Combustor	NA	TBD	TBD	TBD
SCR ³	Catalyst	NA	TBD	TBD	TBD
Oxidation Catalyst ³	Catalyst	NA	TBD	TBD	TBD
Sulfuric Acid Tank (EU#8)	Tank	TBD	TBD	TBD	TBD
Sodium Hydroxide Tank (EU#9)	Tank	TBD	TBD	TBD	TBD

- Notes:
1. Approximate capacity of the unit
 2. TBD: To be determined.
 3. CTG 1 and HRSG 1 represent the emission point representing the stacks (EU#1).
 4. CTG 2 and HRSG 2 represent the emission point representing the stacks (EU#2).
 5. CTG 3 and HRSG 3 represent the emission point representing the stacks (EU#3).
 6. HRSGs can operate without supplemental firing, and in such instances there will be zero capacity based on fueling rate.

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ATTACHMENT "D": PHASE II ACID RAIN PROVISIONS

Air Quality Control Permit No. 1001532

for

Caithness Big Sandy

I. Statement of Basis

Statutory and Regulatory Authorities: In accordance with Arizona Revised Statutes, Title 49, Chapter 3, Article 2, Section 426.N, and Titles IV and V of the Clean Air Act, the Arizona Department of Environmental Quality issues this Phase II Acid Rain Permit pursuant to Arizona Administrative Code, Title 18, Chapter 2, Article 3, Section 333 (A.A.C. R18-2-333), "Acid Rain."

II. SO₂ Allowance[†] Allocations and NO_x Requirements for Each Affected Unit

- A. The Permittee shall comply with the Acid Rain Permit and 40 CFR Parts 72, 73, and 75.
- B. The Permittee shall hold SO₂ Allowances as of the allowance transfer deadline in each combined cycle system compliance subaccount not less than the total annual actual emissions of SO₂ from each combined cycle system for the previous calendar year as required by the Acid Rain Program.
- C. The SO₂ Allowance Allocations and NO_x Requirements for each combined cycle system are as follows:

Affected Unit	Pollutant	Years 2000-2009	Years 2010 and beyond
Combined Cycle Systems	SO ₂ allowances	NA	NA
	NO _x emission limit	These units are not subject to a NO _x emission limit under 40 CFR Part 76.	

[†] As defined under 40 CFR §72.2, "Allowance" means an authorization by the Administrator under the Acid Rain Program to emit up to one ton of sulfur dioxide during or after a specified calendar year.

III. Permit Application

The Permittee, and any other owners or operators of the units at this facility, shall comply with the requirements contained in the Acid Rain Permit Application (Phase II Permit Application and Certificate of Representation) signed by the Designated Representative Kenneth P. Hoffman on July 5, 2001 and 75]

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**ATTACHMENT "E": MONITORING NO_x COMPLIANCE BY
AMMONIA INJECTION RATE MONITORING**

Air Quality Control Permit No. 1001532

for

Caithness Big Sandy

To ensure that the SCR system at the Big Sandy facility is properly operated to achieve the design control rate of 2.0 ppm NO_x, the Permittee shall monitor and achieve a minimum ammonia injection rate for the first two years of commercial operation. Once this two year period is completed and the final NO_x emission limit is determined, the "minimum ammonia injection rate" requirement shall no longer be effective. The minimum ammonia injection rate to achieve 2.0 ppm controlled levels shall be calculated as follows:

Step 1: Calculate the Required NO_x Removal:

This calculation uses the actual measured NO_x concentration at the turbine outlet (i.e., before the SCR system) and the target control level of 2.0 ppm to determine the amount of NO_x that must be removed. The actual turbine outlet NO_x concentration is used because the turbine emissions can vary, and so the amount of NO_x that must be removed also varies. From Equation F-5 in 40 CFR 75 (for converting from ppm to lb/MMBtu):

$$\text{NO}_x = [1.194 \times 10^{-7} (\text{lb/scf})/\text{ppm}][X - 2.0 \text{ ppm}][8,710 \text{ scf/MMBtu}][(20.9\%)/(20.9\% - 15\% \text{ O}_2)]$$

where: X = ppmv NO_x in turbine outlet to SCR
 Flue gas is standardized to 15% O₂ for combustion turbine

Simplifying this equation results in:

$$\text{NO}_x \text{ to be removed} = (0.00368X - 0.00737) \text{ lb/MMBtu NO}_x$$

Step 2: Calculate the Required Ammonia (NH₃) Injection Rate

Since one mole of NH₃ reacts with one mole of NO, but two moles of NH₃ react with one mole of NO₂, the equation uses the relative molecular weights of NH₃ versus NO to calculate the required NH₃ injection rate in units of lb/MMBtu. (Since the ratio of NO₂ to NO is probably less than 0.5, using a molar ratio other than 1.0 would overestimate the minimum required NH₃ injection rate). The minimum rate is, therefore:

$$\text{NH}_3 = [(0.00368X - 0.00737) \text{ lb/MMBtu NO}_x](17 \text{ NH}_3/46 \text{ NO}_x)$$

$$\text{or NH}_3 = (0.00136X - 0.00272) \text{ lb/MMBtu NH}_3$$

Example:

If the measured turbine outlet NO_x at full load without duct burners is equal to the manufacturer's guarantee of 25 ppm, then the required NH₃ injection rate is:

$$\text{NH}_3 = (0.00136 * 25) - 0.00272 = 0.03128 \text{ lb/MMBtu}$$

Step 3: Calculate the Ammonia Usage and Verify Compliance with the Required Ammonia Injection Rate

When the source and type of ammonia is determined (i.e., anhydrous versus aqueous solution at some specified concentration level), the following equation will be used to verify compliance with the required ammonia injection rate:

$$\text{NH}_3 \text{ injected (lb)} = \frac{\text{gallons of NH}_3 \text{ solution used} * \text{density of liquid (lb/gal)} * \text{equivalent concentration of NH}_3 \text{ by weight (lb NH}_3\text{/lb solution)}}{\text{lb NH}_3\text{/lb solution}}$$

Step 4: Compliance Averaging Interval

The daily average (i.e., 24-hour block average) turbine outlet NO_x concentration during periods of normal operation above 75% load will be measured and reported. The daily ammonia consumption during the same time periods of normal operations will also be measured and reported. The above equations will be used to demonstrate compliance with the required ammonia injection rate on a daily basis.